

Having thus described the invention, we claim:

1. A golf ball comprising:
a core having a Riehle compression of at least 75; and
a layer disposed about said core, said
5 layer having a Shore D hardness of at least about 65, said layer including at least one region of weighting material, and at least one other region of layer material less dense than said weighting material.
2. The golf ball of claim 1 wherein said weighting material comprises metal.
3. The golf ball of claim 1 wherein said core has a Riehle compression of from about 75 to about 115.
4. A golf ball comprising:
a core having a Riehle compression of at least about 75; and
an outer layer disposed around said core,
5 said outer layer including at least one discrete region of a weighting material that serves to increase the moment of inertia of said golf ball, wherein said at least one region of weighting material is visible along the exterior of said golf ball, said outer layer having a Shore D hardness of at
10 least about 65.
5. The golf ball of claim 4 wherein said weighting material comprises at least one of metal powders, carbonaceous materials, glass, high strength polyamide fibers, and combinations thereof.
6. The golf ball of claim 5 wherein said metal powders are selected from the group consisting of bismuth powder, boron powder, brass powder, bronze powder, cobalt powder, copper powder, inconel metal powder, iron metal

5 powder, molybdenum powder, nickel powder, stainless steel powder, titanium metal powder, zirconium oxide powder, aluminum flakes, aluminum tadpoles, and combinations thereof.

7. The golf ball of claim 5 wherein said carbonaceous materials are selected from the group consisting of graphite, carbon black, cotton flock, leather fiber, and combinations thereof.

8. The golf ball of claim 4 wherein said weighting material ranges in size from about 10 mesh to about 325 mesh.

9. The golf ball of claim 8 wherein said weighting material ranges in size from about 20 mesh to about 325 mesh.

10. The golf ball of claim 9 wherein said weighting material ranges in size from about 100 mesh to about 325 mesh.

11. The golf ball of claim 5 wherein said weighting material comprises an agent selected from the group consisting of graphite fibers, precipitated hydrated silica, clay, talc, asbestos, glass fibers, aramid fibers, 5 mica, calcium metasilicate, barium sulfate, zinc sulfide, silicates, diatomaceous earth, calcium carbonate, magnesium carbonate, and combinations thereof.

12. The golf ball of claim 4 wherein said weighting material comprises a metal selected from the group consisting of titanium, tungsten, aluminum, bismuth, nickel, molybdenum, iron, copper, brass, boron, bronze, 5 cobalt, beryllium, zinc, tin, and combinations thereof.

13. The golf ball of claim 4 wherein said

weighting material comprises a metal oxide selected from the group consisting of zinc oxide, iron oxide, aluminum oxide, titanium dioxide, magnesium oxide, zirconium oxide, and combinations thereof.

14. The golf ball of claim 4 wherein said weighting material comprises a metal stearate selected from the group consisting of zinc stearate, calcium stearate, barium stearate, lithium stearate, magnesium stearate, and combinations thereof.

15. The golf ball of claim 4 wherein said weighting material comprises a particulate carbonaceous material selected from the group consisting of graphite, carbon black, natural bitumen, cotton flock, cellulose flock, leather fiber, and combinations thereof.

16. The golf ball of claim 4 wherein the amount of said weighting material in said outer layer ranges from about 1 to about 100 parts per 100 parts of material forming said outer layer.

17. The golf ball of claim 4 wherein said weighting material comprises brass powder and the amount of said weighting material is about 10 parts per hundred parts of material forming said outer layer.

18. The golf ball of claim 4 wherein said at least one discrete region of weighting material is in the form of a visible star-shaped perimeter weighting pattern.

19. The golf ball of claim 4 wherein said at least one discrete region of weighting material is in the form of a visible contoured-shaped perimeter weighting pattern.

20. The golf ball of claim 4 wherein said at

least one discrete region of weighting material is in the form of a visible pentagon-shaped perimeter weighting pattern.

21. The golf ball of claim 4 wherein said at least one discrete region of weighting material is in the form of a visible radiused pentagon-shaped perimeter weighting pattern.

22. The golf ball of claim 4 wherein said at least one discrete region of weighting material is in the form of a visible single stripe-shaped perimeter weighting pattern.

23. The golf ball of claim 4 wherein said at least one discrete region of weighting material is in the form of a double stripe-shaped perimeter weighting pattern.

24. The golf ball of claim 4 wherein said at least one discrete region of weighting material is in the form of a multi-stripe-shaped perimeter weighting pattern.

25. The golf ball of claim 4 wherein said at least one discrete region of weighting material is in the form of a stripe and dimple-shaped perimeter weighting pattern.

26. The golf ball of claim 4 wherein said at least one discrete region of weighting material is in the form of a ring-shaped perimeter weighting pattern.

27. The golf ball of claim 4 wherein said at least one discrete region of weighting material is in the form of a spiral-shaped perimeter weighting pattern.

28. The golf ball of claim 4 wherein said at least one region of weighting material is disposed in said

outer layer such that the center of mass of said golf ball coincides with the geometric center of said golf ball.

29. The golf ball of claim 4 wherein said outer layer is comprised of at least one high acid ionomer resin comprising a copolymer of about 17% to about 25% by weight of an alpha, beta-unsaturated carboxylic acid, and an alpha
5 olefin of which about 10 to about 90% of the carboxyl groups of the copolymer are neutralized with a metal cation.

30. The golf ball of claim 4 wherein said outer layer is comprised of at least one high acid ionomer resin comprising from about 18.5% to about 21.5% by weight of an alpha, beta-unsaturated carboxylic acid, and an alpha
5 olefin of which about 10 to about 90% of the carboxyl groups of the copolymer are neutralized with a metal cation.

31. The golf ball of claim 4 wherein said golf ball has a diameter of about 1.680 to 1.800 inches.

32. The multi-layer golf ball having an increased moment of inertia, said golf ball comprising:

a core having a Riehle compression of from about 75 to about 115;

5 an inner layer disposed about said core;
an outer layer disposed about said inner layer, said outer layer having a Shore D hardness of at least about 65; and

an effective amount of a weighting material
10 disposed in at least one of said inner layer and said outer layer.

33. The golf ball of claim 32 wherein said weighting material is disposed in said inner layer and said effective amount of said weighting material ranges from

about 1 to about 100 parts of said weighting material per 100 parts of said inner layer.

34. The golf ball of claim 33 wherein said effective amount of said weighting material ranges from about 4 to about 51 parts of said weighting material per 100 parts of said inner layer.

35. The golf ball of claim 34 wherein said effective amount of said weighting material ranges from about 10 to about 25 parts of said weighting material per 100 parts of said inner layer.

36. The golf ball of claim 32 further comprising:

at least one discrete region of a weighting material disposed in said outer layer.

37. The golf ball of claim 36 wherein said weighting material disposed in said outer layer comprises at least one of metal powders, carbonaceous materials, glass, high strength polyamide fibers, and combinations thereof.

38. The golf ball of claim 37 wherein said metal powders are selected from the group consisting of bismuth powder, boron powder, brass powder, bronze powder, cobalt powder, copper powder, inconel metal powder, iron metal powder, molybdenum powder, nickel powder, stainless steel, titanium metal powder, zirconium oxide powder, aluminum flakes, aluminum tadpoles, and combinations thereof.

39. The golf ball of claim 37 wherein said carbonaceous materials are selected from the group consisting of graphite, carbon black, cotton flock, leather fiber, and combinations thereof.

40. The golf ball of claim 36 wherein said weighting material disposed in said outer layer ranges in size from about 10 mesh to about 325 mesh.

41. The golf ball of claim 36 wherein said weighting material disposed in said outer layer comprises an agent selected from the group consisting of graphite fibers, precipitated hydrated silica, clay, talc, asbestos,
5 glass fibers, aramid fibers, mica, calcium metasilicate, barium sulfate, zinc sulfide, silicates, diatomaceous earth, calcium carbonate, magnesium carbonate, and combinations thereof.

42. The golf ball of claim 36 wherein said weighting material disposed in said outer layer comprises a metal selected from the group consisting of titanium, tungsten, aluminum, bismuth, nickel, molybdenum, iron,
5 copper, brass, boron, bronze, cobalt, beryllium, zinc, tin, and combinations thereof.

43. The golf ball of claim 36 wherein said weighting material disposed in said outer layer comprises a metal oxide selected from the group consisting of zinc oxide, iron oxide, aluminum oxide, titanium dioxide,
5 magnesium oxide, zirconium oxide, and combinations thereof.

44. The golf ball of claim 36 wherein said weighting material disposed in said outer layer comprises a metal stearate selected from the group consisting of zinc stearate, calcium stearate, barium stearate, lithium
5 stearate, magnesium stearate, and combinations thereof.

45. The golf ball of claim 36 wherein said weighting material disposed in said outer layer comprises a particulate carbonaceous material selected from the group consisting of graphite, carbon black, natural bitumen,
5 cotton flock, cellulose flock, leather fiber, and

combinations thereof.

46. The golf ball of claim 36 wherein said at least one discrete region of weighting material is in the form of a visible star-shaped perimeter weighting pattern.

47. The golf ball of claim 36 wherein said at least one discrete region of weighting material is in the form of a visible contoured-shaped perimeter weighting pattern.

48. The golf ball of claim 36 wherein said at least one discrete region of weighting material is in the form of a visible pentagon-shaped perimeter weighting pattern.

49. The golf ball of claim 36 wherein said at least one discrete region of weighting material is in the form of a visible radiused pentagon-shaped perimeter weighting pattern.

50. The golf ball of claim 36 wherein said at least one discrete region of weighting material is in the form of a visible single stripe-shaped perimeter weighting pattern.

51. The golf ball of claim 36 wherein said at least one discrete region of weighting material is in the form of a double stripe-shaped perimeter weighting pattern.

52. The golf ball of claim 36 wherein said at least one discrete region of weighting material is in the form of a multi-stripe-shaped perimeter weighting pattern.

53. The golf ball of claim 36 wherein said at least one discrete region of weighting material is in the form of a stripe and dimple-shaped perimeter weighting

pattern.

54. The golf ball of claim 36 wherein said at least one discrete region of weighting material is in the form of a ring-shaped perimeter weighting pattern.

55. The golf ball of claim 36 wherein said at least one discrete region of weighting material is in the form of a spiral-shaped perimeter weighting pattern.

56. The golf ball of claim 32 wherein said core has a Riehle compression of 80 to 90, and a diameter of about 1.540 to about 1.545 inches.

57. The golf ball of claim 32 wherein said golf ball has a diameter of about 1.70 to about 1.80 inches.